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TITLE: The effect of ultrasonic waves upon the nitriding process

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TEXT: Investigations were made in liquid and gas medium. The nitriding bath was melted in a X18H9 (Kh18N9) steel crucible and was composed of 31% barium chloride, 48% calcium chloride and 21% sodium chloride. Ammonia was passed through the liquid bath to which ultrasonic oscillations were applied. Microhardness was measured over the section of a layer obtained in liquid nitriding with and without ultrasonic oscillations. Gas nitriding was performed in a special-designed electric furnace (its schematic diagram is presented) under the following conditions: temperature - 540 - 560°C; holding time - 10 hours; gas pressure in the furnace 45 - 55 mm oil column. After completed holding the

ultrasonic oscillator was switched off. Cooling down to 400°C was performed during ammonia supply; and down to room temperature - together with the furnace. The schematic diagram of the furnace and curves of microhardness distribution over the cross section of the specimen after nitriding, are given. The results of gas and liquid nitriding were compared and showed the advantage of gas nitriding, yielding higher hardness and deeper penetration. The depth of the nitrided layer and hardness increase under the ultrasonic effect both for liquid and gaseous media.

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[Abstracter's note: Complete translation]